



Infrastructure Needs Study

January 15, 2024

City of Port Colborne

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1. Introduction

The City of Port Colborne (City) is a lower-tier municipality of approximately 20,000 population (2021 census) on the shore of Lake Erie in the Niagara Region (Region). Most residents live in the urban core, the south-west corner of the City, which comprises roughly 20% of the entire City area. In 2022, the City initiated an Asset Management Plan (AMP) and Infrastructure Needs Studies (INS) for its core infrastructure, which includes systems for water distribution, wastewater collection, stormwater management, and the road network (roads, sidewalks, guideways). The study area for this project includes the urban area boundary, whilst rural areas are excluded in the project scope.

1.1. Study Objectives

The aim of the INS is to provide the City with an actionable road map with an implementation schedule and budget. Each asset category has different infrastructure needs, from data collection, master planning, hydraulic model build, state of good repair, and hard infrastructure to accommodate planned growth. The outputs of the INS will be used to inform the completion of the 2024 and 2025 AMPs as well as the water, wastewater, and stormwater master plans. The key objectives of this study are:

- Complete condition assessment to augment existing data.
- Assess the State of Good Repair of the systems based on available data.
- Identify current and potential future deficiencies and corresponding solutions.
- Identify infrastructure needs to address future short and long term demands according to City's growth plans.
- Develop a 15-year lifecycle and growth demand analysis based on available data and growth data format.

1.2. Performance Objectives

An Asset Management Plan was initiated concurrent to this study to meet the July 1, 2022, deadline under O. Reg. 588/17. The Plan documents the current state of core City assets, their desired levels of service, the lifecycle activities required to maintain them, and potential strategies for financing entire asset lifecycles. It provides a framework to help City staff and Council make infrastructure decisions while considering multiple long-term community objectives. A detailed assessment of the City's level of service for all core assets is provided in the AMP. Level of Service (LOS) describes the capacity, function, and quality of the City services provided by an asset using a variety of performance measures. Some of these measures are mandatory under provincial regulations, while others are established by the City to help determine the relationship between the level of service provided and the associated operating and capital costs required to achieve that service. This framework enables the performance of the system to be tracked over time relative to the desired level of service and core values developed as part of the Asset Management Plan (refer to AMP for details).

1.3. Master Servicing Plans

The City is currently undertaking the Wastewater Pollution Prevention Control Plan, which also acts as the Wastewater Master Servicing Plan (MSP). The servicing strategy will be identified by 2024-Q2 and completion of the EA by 2024-Q3.

The Water and Stormwater MSPs are set to kickoff 2024-Q2 with the servicing strategies identified by 2025-Q2, so that the capital projects can be incorporated into the City's 2025 AMP.

It is recommended that the Water, Wastewater, and Stormwater MSPs become one consolidated MSP moving forward, completed every 5 years. The consolidation of the studies will allow for synergies, cost savings, corridor planning, and generally a more holistic view of the infrastructure needs of the three systems. Furthermore, it is critical that they consider the state of existing infrastructure when identifying the overall growth servicing strategies.

In addition to the Consolidated Water, Wastewater, Stormwater MSP, the City must complete a Transportation Master Plan every 5 years, which should occur simultaneously. The outputs of the master plans will be aggregated and used as an input to the AMP and Development Charge (DC) studies, which should be updated after the completion of the MSPs.

Note that presently the INS is acting as a high-level needs study in place of the MSPs. The recommendations are justifiable and sufficient for budgeting purposes. The INS acts as a roadmap for the City. The next three years of data collection, model builds, MSPs, and AMPs, will be the framework for future infrastructure needs studies as development occurs and the system expands.

1.3.1. Corridor Planning

As mentioned above, corridor planning is critical to ensuring cost-effective implementation of projects, public perception of City planning, and growth planning. Since the advancement of trenchless rehabilitation technologies, most defective sanitary and storm infrastructure can be rehabbed without open cut. Watermains are typically open cut, especially local watermains due to the shallow nature of the infrastructure. However, when contaminated soil is present, trenchless rehab of watermains may be more cost effective. Corridor planning is not as critical when infrastructure is rehabbed via trenchless technologies, but when infrastructure is upsized or in need of replacement due to collapsed or deformed pipe, the road is typically excavated and corridor planning and opportunities to coordinate infrastructure rehab (trenchless or rehab in general) needs to be considered. Corridor planning will be enhanced with the single consolidated MSP.

1.4. Asset Management Plan

As mentioned in Section 1.3, the servicing strategies identified in the MSPs will enhance the recommendations from the INS and inform the completion of the 2025 Asset Management Plan Update. This will ensure that all growth-related projects and servicing strategies for Water, Wastewater, and Stormwater are incorporated into the City's overall infrastructure needs program with considerations for the state-of-good-repair needs for each system.

1.4.1. Infrastructure Dashboard

As part of the ongoing AMP, an Infrastructure Dashboard is being developed that will contain the outputs of the INS, MSPs, and AMP, including charts, figures, and tables. The data will leverage the City's current GIS and asset condition data. The Infrastructure Dashboard will give the City a tool with an easy-to-use interface with quick access to important information such as capital project highlights, budget ready programs, system condition, and a list of growth servicing capital projects. The City can use the dashboard for internal meetings or external presentations to council, demonstrating the advancement of data driven solutions.

1.5. Development Charge Study

The City's current Development Charge (DC) is being updated by Watson & Associates and should be completed by the Q2 of 2024. This will provide the City with a justifiable increase in the collected DCs, which is required to fund the capital projects needed to service the significant growth pressures throughout the City. It is recommended that the DC be updated in 2026 once the MSPs are completed and the growth servicing strategies for Water, Wastewater, and Stormwater systems are finalized.

2. Planning Data

Based on its Official Plan, the Region has allocated population growth for the City up to 23,200 in 2051, an increase of about 3,200. This growth plan operates in conjunction with other Regional policies for planning essential infrastructure such as the Transportation Master Plan and Water/Wastewater MSP to ensure that growth is accommodated in a manner that is economically viable and supports Provincial policy. This plan was developed after extensive consultation with local municipalities regarding land supply and intensification potential.

However, recent data from Statistics Canada shows the Region's population increased by 6.7% since 2016, higher than the national and provincial average growth rates. The City's population grew by over 9%, the second highest in the Region, behind the City of Thorold. Migration to the area has been instigated by the Region's proximity to Greater Hamilton and Toronto and its relative affordability along with rising inflation and options to work remotely.

Many developers are assessing opportunities in the City, primarily for multi-residential units. The projected growth for the City, previously set by the Region as part of their Master Plan, was lower than the anticipated City projections. Last year, the City was envisaging a population increase of over 12,000 in the next 15 years, though this is dependent on a variety of factors and may be overly ambitious due to potential limits in providing adequate services for this rapid increase. More recent projections (Dillon Consulting, 2023) used for this analysis are based on current probable developments, remaining vacant lands designated for growth, and intensification of current areas over the long-term.

2.1.1. Development Areas and Growth Details

The City of Port Colborne examined existing growth projections developed as part of the Region of Niagara Master Servicing Plan (2022) to determine their usefulness for the INS project. To apply growth values that are in line with the City's projections, the City engaged Dillon Consulting to evaluate the growth allocations to be applied to the INS projects.

It is recognized that municipalities must incorporate the Regional allocation into local official plans, the Regions Official Plan also permits municipalities to plan for growth that would exceed these numbers for the purposes of understanding and informing development charges (DC) and for infrastructure planning, given this is within the confines of the urban boundary. Dillon was tasked with a growth analysis study which includes determination of an estimate of regional capacity for residential and employment growth to inform the DC Study, infrastructure planning and the City's growth framework in their new official plan.

GMBP utilized the information provided by the City and Dillon for the INS project. Growth projections were provided for both residential population and employment capacity. These values are considered full build-out, but an accompanying timeline was not provided as there are many factors that can impact the rate of development. For modelling purposes, these values are assumed for the year 2051. Planning data, including intensification data, is provided by the City and is summarized in Appendix A.

2.1.2. Residential Capacity

The estimated total population at build-out is 36,380, which accounts for the decline in the existing base. Note, there are many factors that would impact timing for full buildout and thus it was not possible to assign a specific point in time when this would be achieved.

The development pipeline consists of draft approved plans, unbuilt units on registered plans, in-process applications, and vacant land designated for residential development. It was derived from the City's development database, which we received in December of 2022 and filtered by Dillon to include only those entries in the database that met the definition of "development pipeline". In total, 20 of the 39 entries in the City's development database met the criteria for being considered pipeline. As noted in Table 1, this includes 4,149 units.

Table 1: Development Pipeline Summary

Policy Area	Development Pipeline
Built-up Area	865
Intensification Area 1	21
Intensification Area 2	96
Rest of the Built-up Area	748
Designated Greenfield Area	3,284
TOTAL	4,149

Note the above analysis was conducted based on known and real development applications.

Following determination of the residential development capacity above, estimated capacity for residential development on all remaining vacant lands designated for residential development within each policy planning area was determined. This additional analysis was conducted based on total quantum area of vacant residential land in the City and estimating the potential capacity for development. The estimated total area calculations for vacant land are outlined in Table 2 and Table 3. Note, these are preliminary estimates but due to timing constraints for the INS project were utilized in the magnitude provided.

Table 2: Vacant Land Designated for Residential Development

Policy Area	Vacant Residential Area (ha, net)	% of Vacant Land Supply
Built-up Area	11.49	7.2%
Designated Greenfield Area	148.44	92.8%
TOTAL	159.93	100%

Table 3: Vacant Land Potential Capacity for Development

Policy Area	Vacant Residential Area (ha, net)	Gross Adjustment (%)	Net Developable Area (ha)	Total Units
Built-up Area	11.49	N/A	11.49	427
Designated Greenfield Area	148.44	50%	74.22	1,362
TOTAL	159.93	N/A	79.97	1,789

Within the Intensification Areas, Dillon excluded any development pipeline and vacant land development opportunities and worked with City staff to estimate a probability of change/redevelopment over a 25-year timeframe. Dillon used an aggregated average estimated area of major change for the whole area. The results of this analysis indicate that there is potential for an additional 510 residential units within the City's Intensification Areas, with 102 located in IA1 and 409 located in IA2. Dillon was not able to assign this capacity to specific parcels, blocks, or lots, but assigned it over the generalized conceptual intensification areas as identified in the City's Official Plan. Table 4 provides the total estimates for reference.

Table 4: Intensification Estimates

Policy Area	Development Pipeline	Vacant Lands	Intensification/Redevelopment	Total Units
Built-up Area	865	427	510	1,802
Intensification Area 1	21	66	102	189
Intensification Area 2	96	4	409	509
Rest of the Built-up Area	748	357	-	1,105
Designated Greenfield Area	3,284	1,362	-	4,646
TOTAL	4,149	1,789	510	6,448

2.1.3. Employment Capacity

Dillon examined future employment capacity for the City and advised GMBP of the estimated growth in employment by type, allocation of jobs to the City's designated employment areas (employment lands employment), and the estimated total population of the City at full buildout. Note, this data was a preliminary analysis undertaken to inform the INS project. The City is forecast to achieve a total of 11,761 jobs to the 2051 period, which represents a growth of 5,166 jobs between 2022-2051. Table 5 provides an estimate of employment growth by type.

Table 5: Employment Growth Distribution by Type

	2021	Growth	2051
Major Office Employment	0	0	0
Population-Related Employment	3,470	2,670	6,141
Employment Land Employment	2,209	2,051	4,260
Rural Employment	915	445	1,360
Total	6,595	5,166	11,761
Notes: - Total 2051 employment is based on maintaining the 2021 Activity Rate of 32% applied to estimated total built out population of 36,830. - No major office growth anticipated to occur over the forecast horizon - Population-related employment growth is estimated using the 2021 Hemson estimated rate of 1 job for every 6.2 new residents - 2051 Rural Employment kept at Hemson total for 2051 - Employment Land Employment (industrial) calculated as the residual in 2051 from other types of estimated employment growth over the period			

The employment land growth of approximately 2,100 jobs is expected to be distributed largely to the Gateway Economic Centre (GEC, PC2) and in a range of canal-related activities arising out of the pending Federal investments announced in early 2023. At a density of 25 jobs per net ha (PC2), development of approximately two-thirds of the GEC would yield 1,700 jobs with the remainder of growth in canal-related activities in the PC1 employment area (roughly 400 jobs).

The 2,670 population-related employment jobs would be scattered throughout the City's urban area, generally within the existing commercial and mixed-use designations. The 445 rural employment jobs would be located outside of the City's urban area, with the majority in the City's designated rural employment area.

3. Infrastructure Needs

The following sections of the report summarize the key findings and recommendations from the individual asset Infrastructure Need Reports in Appendix B – H. See the reports in the appendices for details and justification for the infrastructure need projects.

3.1. Water

The Water Distribution INS Report is provided in Appendix B.

In 2014, the “Water Distribution Infrastructure Needs Study” (Associated Engineering) was completed as an update to the City’s 1996 INS. The intention of the update was to provide strategies to manage system improvements and prioritize recommended capital projects. The final recommendations included 5 risk/reliability related improvements and 21 hydraulic capacity improvements, which would alleviate fire flow deficiencies at 24 hydrants.

More recently in 2019, the City Engineering and Operations Department, together with the Treasury Department, prepared the “Port Colborne Distribution System Financial Plan (2019-2029)” in accordance with O. Reg. 453/07, which stipulates an approved financial plan for at least six years as a condition for a municipal drinking water licence. The plan details how the system will maintain service levels and achieve full-cost recovery over the long term. Of note, the plan highlights the City’s substantial infrastructure deficit, with a large portion of watermains past their life expectancy and a plan to increase water rates to help cover replacement costs over the next decade.

As part of the 2023 INS, the City provided GMBP with the water distribution hydraulic model. The model was used as provided with no further calibration as a full model build and calibration is proposed as part of the 2024 Water MSP. Existing and future growth scenarios were simulated to identify pressure and fire flow deficiencies throughout the system. The model outputs combined with an assessment of watermain material, age, and size were used to identify watermain replacement and watermain upgrade needs.

3.1.1. Water Distribution Infrastructure Needs

The program comprises of data collection, system analysis, watermain replacement, and new infrastructure projects. The specific infrastructure upgrades will be re-examined as part of the 2024 Water Master Plan.

Replacement of Existing Watermains

The watermain replacement analysis highlights **\$59,186,000** of watermain to be replaced over a 15-year period. This program will ensure that the majority of the 150mm cast iron watermains are replaced within the next 20 years, which is 78% of the program cost. Note that some watermains are recommended to be upsized, however, these will be confirmed as part of the 2024 Master Servicing Plan. Note the following:

- Prioritization is based on fire flow deficiencies, corridor planning, and city priorities. The current recommendation is over a 15-year horizon.
- Fire flow deficiency analysis will be updated as part of the 2024 master servicing plan.
- Future updates to the watermain replacement prioritization should include detailed break analyses after sufficient data is collected.
- PVC pipes identified in the analysis are included for upsize not replacement like for like. Only cast iron pipes are included for replacement like for like.
- It is recommended that the City consider trenchless rehabilitation in areas with potential soil contamination.

Growth Related Capital Projects

The hydraulic model was used to identify growth related capital needs. The estimated capital program is **\$46,082,100 in 2023 dollars**. Note that the capital program will be revised during the completion of the 2024 Water Master Plan.

District Meter Assessment

A District Meter Assessment (DMA) would serve to divide the City's water distribution system into zones to determine areas that are contributing to the most water loss. When the areas are prioritized, acoustic leak detection can be used to find the leaks within each zone to be repaired. The zones and metering equipment can be used on a continuous basis thereafter to monitor for any new leaks. It is estimated to take six months to complete at a cost of **\$50,000**, however, this will depend on previous city efforts. It is recommended that this be completed as part of the 2024 Master Servicing Plan. Following the assessment will be **\$300,000** of implementation.

2024 Master Servicing Plan and Model Calibration

The water master plan should be updated every five years. The previous master plan is almost 10 years old, therefore, an update is recommended for 2024 (**\$200,000**). This update will include data collection, model calibration, and the EA component. It is recommended that future water master plans be completed simultaneously with wastewater and stormwater as a single combined study, which will allow for efficiencies, cost savings, and corridor planning; first one beginning 2029. The outputs of the master plan should be inputs into the development charge update and asset management plan update that follows.

3.2. Wastewater

The Wastewater INS Report is provided in Appendix C.

The objectives of the Wastewater INS are to assess existing infrastructure condition, determine state of good repair needs, and identify capital project needs to accommodate planned growth. Note that the City is currently updating their Pollution Prevention Control Plan (PPCP) with an estimated completion date of June 2024. The objective of the PPCP is to construct an all-pipe model calibrated with comprehensive flow data and develop a wastewater system servicing strategy. Whilst the PPCP is being completed, the INS provides a great starting point for the City, which will be revised as additional data and information becomes available.

The City of Port Colborne is generally flat, resides primarily on rock, and has a high groundwater due to the canal and proximity to Lake Erie. These conditions give the City a unique set of problems to solve as they relate to construction costs, inflow and infiltration reduction, and general wet weather management. Due to these conditions, understanding the interaction between the wastewater and stormwater sewer systems is critical when developing the City's servicing strategies. The flatness of the land makes it difficult to manage overland flow during intense rainfall events, the proximity to the lake and canal cause issues with stormwater outlets, and the high groundwater table leads to ongoing infiltration. When developing the wet weather management solutions as they relate to the wastewater system, the capacity and condition of the stormwater system and stormwater servicing plan is critical to the wastewater servicing strategy.

In addition to assessing infrastructure condition data, a comprehensive wet weather management analysis was completed using 19 flow monitors from the PPCP that allowed for isolation and characterization of inflow and infiltration throughout the system. The prioritization of each of the 19 areas was used to inform some of the short and long term infrastructure needs. Lastly, the hydraulic model was used to simulate a growth scenario and identify capital projects required to service the proposed developments.

3.2.1. Wastewater Infrastructure Needs

The program comprises of data collection, system analysis, trenchless rehabilitation, and new infrastructure projects. The specific infrastructure upgrades will be re-examined as part of the ongoing PPCP update, scheduled for completion in 2024-Q3.

Flow Monitoring

A corporate flow monitoring program is recommended with an initial annual budget of **\$100,000**. The corporate flow program will be used to:

- Update and calibrate hydraulic model.
- Development reviews and approvals
- System anchor monitoring
- Wet weather management program
 - Locating and qualifying sources of I/I
 - Pre-post rehabilitation analyses
- System alarming

Hydraulic Model

The all-pipe model being developed as part of the PPCP will be used for the following:

- Completion of the 2023 PPCP
- Development reviews
- Infrastructure planning analyses
- Future master plans
- Operational strategies and wet weather reduction impact analyses.

Management of the model can be completed internally or by consultants. It is recommended that the City plan for **\$25,000 annually** for maintenance, updates, and development reviews.

Master Servicing Plan

The wastewater master plan should be updated every five (5) years. It is recommended that future wastewater master plans be completed simultaneously with water and stormwater as a single combined study, which will allow for efficiencies, cost savings, and corridor planning; first one beginning 2029. The outputs of the master plan should be inputs into the development charge update and asset management plan update that follows.

Infrastructure Condition Data

The following highlights key recommendations:

- Development of data management framework - **\$25,000**
- Existing sewer CCTV gaps - **\$386,000**
- City-wide manhole scans - **\$150,000**
- City-wide lateral launches - **\$1,200,000**
- Annual CCTV Program - **\$100,000**

Infrastructure Rehabilitation

It is recommended that trenchless rehabilitation be completed wherever possible for the following reasons:

- Cost-effective; spot repairs \$10,000-\$15,000 and lining typically \$30,000-\$50,000.
- Minimal disturbance and quicker (i.e. can get more pipe fixed in shorter amount of time)
- Industry is evolving in favour of trenchless rehabilitation (a lot more contractors and new technologies compared to 10 years ago)
- Note that some cases open cut will still be required but the consultant will determine in their detailed design/assessment.

The following highlights key city-wide recommendations:

- Sewer rehabilitation - **\$10,000,000**
- Manhole repair - **\$900,000**
- Lateral repair - **\$8,000,000**

It is recommended that after the Priority 1 manholes and laterals are repaired, flow monitoring be used to assess needs for manhole and lateral repairs in Priority 2 and 3 areas.

Wet Weather Management Program

It is recommended that the City implement a long-term wet weather management program with the following objectives:

- Locate sources of inflow through a field investigation program,
 - Includes smoke testing, dye testing, property assessments, foundation inspections, and public engagement.
- Develop a remediation strategy,
- Track work being done in GIS,
- Measure the outcome of the remediation work through the flow monitoring program.

It is recommended that the City budget **\$200,000 annually** from 2024-2026, completing the wet weather reduction work prior to the proposed 2029 master plan update. The following is a list of capital work that is anticipated as part of the proposed \$600,000:

- Downspout disconnection, including development of framework,
 - Framework includes KPI (key performance indicator) tracking, dashboard graphs and statistics, data management structure)
- Cross-connection disconnection, e.g. catch basins,

Foundation disconnection should be considered after all other wet weather management strategies have been implemented and their impacts tracked and tested with the hydraulic model. It is recommended that the city carry **\$1,000,000** in the 10 year plan with the expectation of disconnected 100 homes in the high priority areas.

Growth Related Capital Upgrades

The hydraulic model was used to identify growth related capital needs; see Appendix 6. The estimated capital program is **\$59,127,500 in 2023 dollars**. Note that the capital program will be revised during the completion of the PPCP in spring 2024.

3.3. Stormwater

The Stormwater INS Report is provided in Appendix D.

A previous “Storm Sewer System Infrastructure Needs Study” (Associated Engineering, 2014) had similar objectives to the INS and proposed various improvements for each of the identified 22 drainage areas, including upgrades to existing sewers to meet 5-year storm capacity, replacing “non-designed” sewers, and new sewers to accommodate private sump pump discharges in areas currently not serviced by storm sewers. The recommended capital works had a total cost of over \$54 million, with the financial plan suggesting an annual investment of \$3.02 million. Approaches for funding included implementing stormwater user fees or increasing property taxes.

Since 2014, a few improvements have been completed. A stormwater fee was approved in 2016, which entails an annual flat rate for all parcels within the urban boundary based on their property designation. This fee helped fund the Nickel Area Storm Sewer reconstruction project (area bounded by Welland Canal, Lake Rd., Davis St., and Durham St.)

The City’s stormwater collection system is only within the urban core, while the rural areas are served by roadside ditches and municipal drains. According to previous reports, the earliest storm system was built in 1929 and roadside ditches were replaced with pipes over time, but not necessarily designed to any standards. The 2014 INS report found approximately 40% of the system designed to expected standards.

The aim of the INS is to revisit the current condition of the stormwater network, build off the recommendations from the 2014 study, and provide a roadmap that the City can use to improve performance and reliability.

3.3.1. Stormwater Infrastructure Needs

The program comprises of data collection, system analysis, stormwater replacement, and new infrastructure projects. The specific infrastructure upgrades will be re-examined as part of the 2024 Stormwater Master Plan.

Condition Data and GIS Update

The City has an incomplete inventory of the stormwater system, which is problematic from infrastructure planning, maintenance planning, and capacity management perspectives. It is recommended that the City complete an inventory and condition assessment of their current storm system to allow for the effective planning of improvements whilst allowing for the diagnosis of localized and systemic flooding problems.

The total project cost is estimated at **\$675,000**.

- Sewers: complete zoom camera on all storm sewers of 600mm or less (\$350,000). The data will be used to develop a follow-up CCTV program for the pipes in critical condition and the pipes greater than 600mm (estimated at \$200,000 but will depend on findings from the zoom camera work).
- Manholes: complete manhole assessments for every manhole, including GPS locates, high definition scans, and identification of invert levels (\$100,000).
- GIS Update: use all condition data, spatial data, and attribute data to update the City's storm system GIS layers (\$25,000). This will be used to develop the future all-pipe stormwater model and inform the completion of the stormwater master servicing plan.

Flow Monitoring and Model Build

A comprehensive flow monitoring program (spring 2024 - **\$100,000**) is recommended simultaneously with the condition data collection and GIS update. This project will inform the 2024 Master Servicing Plan.

Hydraulic Model Build

A comprehensive all-pipe model (summer 2024 - **\$50,000**) is recommended to inform the 2024 MSP. The model will use the inventory data and flow monitoring data.

2024 Master Servicing Plan

The stormwater master servicing plan should be updated every five (5) years. The previous master plan was 2015 and did not include a calibrated all-pipe model or condition data for the storm network. It is recommended that a comprehensive master plan (**\$150,000**) be completed in 2024 after all the data has been collected (condition, inventory, flow monitoring).

It is recommended that future stormwater master plans be completed simultaneously with water and wastewater as a single combined study, which will allow for efficiencies, cost savings, and corridor planning; first one beginning 2029. The outputs of the master plan should be inputs into the development charge update and asset management plan update that follows.

3.4. Roads

The Roads INS Report is provided in Appendix E.

The objective of this report is to provide the City of Port Colborne with a comprehensive Road Needs Study that will allow staff to effectively allocate operating and capital funds to manage its road network, and to meet the requirements of O.Reg. 588/17 Asset Management Planning for Municipal Infrastructure. A key aspect of this study was to perform a network-wide road condition assessment. The condition assessments were conducted using applicable MTO rating methodologies based on the surface type of the roadway. The results of the survey provided a Pavement Condition Index (PCI) score for each road segment of the road network.

Through a comprehensive pavement management analysis, this report provides the City with current feasible maintenance and rehabilitation (M&R) needs across the City's 'hard top' (Hot Mix or Surface Treated) road network, as well the potential impact various budget scenarios would have on the network level of service over the next 10 years. In addition, this report provides a list of annual prioritized road sections for M&R treatments, based on a budget scenario that maintains the current PCI (level of service) over the next 10 years.

The findings of this report should be used as a decision-making tool in developing the City's annual road maintenance and rehabilitation program and determining estimated funding requirements to maintain a desired level of service. In that regard, the findings of this report should feed into and support the City's overall asset management plan, where determinations of level of service, decision making criteria and priorities will be a transparent public process.

3.4.1. Road Infrastructure Needs

Based on the findings of the pavement condition assessment, the City is currently providing an overall "Good" condition level of service on the both the "hard top" and gravel road networks, with average PCI scores of PCI=74.3 and PCI=71.2 respectively. The needs analysis of the 425 lane-km "hard top" road network identified approximately \$34.8M of maintenance or rehabilitation backlog currently exists across the road network. The budgeting analysis indicates that the anticipated funding level to address the most cost-effective maintenance and rehabilitation work over the next 10 years will be insufficient to maintain the hard top road network at its current condition level of service. The analysis predicts the "hard top" road network average PCI would drop from 74.3 in 2023 to a PCI=69.4 by 2032. The City's anticipated 10-Year funding outlook for the hard top roads will aggregate to approximately \$24.1 Million over the next 10 years, however, this level of funding will not maintain the hard top road network at the current PCI level. To maintain the hard top road network at current levels, it is estimated that approximately \$25.7 Million, or an average of **\$2,600,000 annually**, will be required for maintenance and rehabilitation work over the next 10 years.

For the gravel road network, current maintenance operations and funding levels appear sufficient based on the condition of the gravel roads at the time of the assessment. However, the City will need to continually assess the annual operational costs, including staffing equipment and material when developing annual maintenance budget needs. Over the longer term, future development in and around the City will result in increased traffic volumes and/or changing traffic patterns, which will likely result in increased maintenance or rehabilitation demand on the current gravel road network. As a result, it is anticipated that it will become increasingly more cost-effective to convert some gravel roads to a hard top surface. Any gravel road conversion project should be considered as a stand-alone capital project and thus not impact the funding of the City's annual road maintenance and resurfacing programs.

The Maintenance Classifications for each road section of the network were determined using limited available traffic data. The City should review the data regularly and update traffic counts and confirm posted speed limits as required. Traffic counts should be prioritised for roads where the current estimated traffic count is near the next Maintenance Class threshold

and for any gravel roads that may be under consideration for conversion to a hard-top surface. The road condition surveys should be conducted every 2-3 years using consistent methodologies that provide objective and comparable results. It should be noted that for asset management reporting, and compliance with Ontario O. Reg. 588/17 (amended by O Reg 193/21) Asset Management Planning for Municipal Infrastructure, the regulation states that data used for reporting current asset performance be at most 2 calendar years old.

3.5. Sidewalks

The Sidewalks INS Report is provided as part of the Road INS Report in Appendix E.

As part of a scope change for the INS, a sidewalk inventory and condition assessment were completed. Sidewalks were visually inspected for deficiencies by GMBP staff during October and November 2022. The GMBP inspectors examined each sidewalk and assigned all observed defects a rating on a scale of 0 to 5 along with a representative photo of each type of defect. A total of 6,004 defect observations were recorded. The extent of each defect was recorded by number of sidewalk panels or meters, as appropriate, though most were measured by panels. Though each sidewalk section may have numerous defects of various rankings or afflicted lengths, the highest score found on each asset was assigned as “Peak Score”. Most defects by length are considered minimal, primarily cracking or surface spalling, which present a lower tripping hazard. However, nearly half of the sidewalk sections with defects have some vertical displacement of the panels, which may pose a minor tripping hazard.

3.5.1. Ontario Sidewalk standards

Sidewalks are part of the City’s transportation system and should have an asset management strategy to maintain their function considering public safety as well as the City’s fiscal constraints. This will help avoid sudden, unexpected needs for large capital expenditures and certain preventative maintenance expenditures could extend the life of some sections.

Ontario Regulation 239/02 Minimum Maintenance Standards for Municipal Highways (Municipal Act, 2001, S.O. 2001, c. 25) requires all sidewalks to be inspected each year for vertical surface discontinuities. If a vertical surface discontinuity exceeds 2 cm, the standard is to treat discontinuity within 14 days after becoming aware of the defect or take reasonable measures to protect users from discontinuity (O. Reg. 239/02, s. 16.1).

As many of the City’s sidewalks were built decades ago, it is apparent that some do not meet current minimum standards for sidewalk width (1.5 m or wider, depending on conditions, OPSD 310.010). Upgrades to meet current standards should be incorporated into any future road reconstruction projects.

3.5.2. Sidewalk Infrastructure Needs

The following is recommended as it relates to the sidewalk asset class:

- While it may not be necessary for all sidewalks to be in perfect condition, there is a requirement to address the major vertical displacements to avoid potential injury and

insurance claims due to tripping hazards. The remediation may consist of grinding down high spots or mud jacking low panels to restore their original elevation.

- Upgrade all sidewalks to current standards for accessibility and width, including sidewalks with missing ramps.
- Tie in the active transportation master plan prior to upgrade sidewalks. Identify streets where sidewalks are only required on one side and rather than upgrade both, remove the one that is not necessary. This will save the City maintenance costs, replacement costs, and future liability should the unnecessary sidewalk fail.
 - City to decide replacement or removal on case by case basis.
 - City to start with a review of schools, downtown core, and west street.

Note the active transportation MSP and engineering standards are ongoing and the sidewalk infrastructure needs should be revisited after completion of these studies. For budgeting purposes, it is recommended that the City budget **\$150,000** to fix all grade 5 defects immediately, and another **\$100,000** for the remaining lesser grade defects.

3.6. Guiderails

The Guiderails INS Report is provided as part of the Road INS Report in Appendix E.

Condition data was collected as part of the scope with inspectors examining each guiderail and assigning a defect rating on a scale of 0 to 5. The defects were scored by component such as post, cable, or rail, as applicable, along with a written observation of the deficiency. As well, the proportion of the asset that contains the defect is estimated and used to determine an Overall Score. Maps were created highlighting guiderails in need of replacement based on condition (score of 4 or 5) and those needing upgrades based on standards. Any guiderail in poor condition is recommended for full replacement as it is generally not cost-effective to spot repair these assets. As for upgrade needs, it is recommended that all post-cable guiderails be upgraded to box beam. The total estimated infrastructure need for guiderails is **\$160,200**.

Table 6: Guiderail Costing Table

Timeline	Score	Length (m)	Cost
Immediate	4, 5	186	\$48,300
3-5 years	3	139	\$36,200
5+ years	1, 2	291	\$75,700

3.7. Bridge Inspections (OSIM)

OSIM data was collected for bridges as part of the INS; Appendix F contains the data and reports. A comprehensive INS report was not included as part of the base scope of work.

